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Uncharted territory for precast technology – first precast concrete plant opened in Ecuador

As far as precast construction is concerned, Ecuador was a blank sheet two years ago. Conventional construction methods were the norm, productivity was often low and the rate of accidents on construction sites high. When the State concern, EPCE was assigned the task of developing a new, efficient construction system, the choice was made for precast construction. With the support of two companies within the Progress Group, Echo Precast Engineering and Tecnom, the first precast concrete plant in the country was constructed. There, EPCE is now successfully producing hollow core slabs and solid walls.

Constructing with precast concrete elements is becoming ever more popular in many parts of the world. The advantages of this method are obvious. Precast elements can be produced cost-effectively, rapidly and under controlled conditions and assembled quickly and safely on the construction site. They also have features, which are lacking in other construction systems – and the raw materials required for their manufacture are available practically all over the world. Solutions, which keep investment costs manageable, but which can revolutionise the construction industry, are also offered to countries and regions with no experience of these technologies.

First precast concrete plant in Ecuador

Thus, the first precast concrete plant in Ecuador began operation in Riobamba, 200 km south of the capital, Quito. Since then hollow core slabs have been manufactured on two production beds, and solid walls have been produced on a total of seven tilting tables. EPCE (Empresa Publica

Cementera del Ecuador), the operator of the plant, uses the precast concrete elements both for public and for private buildings.

Major project recently completed

The first major project was completed in August of this year in Guayaquil, Ecuador's largest city. EPCE supplied the hollow core slabs for the newly constructed multi-storey car park for the catholic university. More than 10,000 m² of 8 m long hollow core slabs were installed on 5 levels and the addition of 2 more levels is in the planning stages.

Earthquake-resistant construction

The car park was already under construction when the severe earthquake of 16th April 2016 struck. It withstood the earth tremors and remained undamaged as anticipated. This was the first practical test of the hollow core slabs and the connections between the precast elements. The elements

were produced by EPCE in a specific manufacturing process, which increases shear strength – a must in a country subject to earthquakes.

Increasing industrialisation of the construction industry

Constructing with precast elements is uncharted territory for Ecuador, where until today traditional methods dominated the construction industry. Up until a few years ago the building industry was industrialised only to a slight extent. This was accompanied by low productivity and a high rate of industrial accidents.

The State of Ecuador was ready to change this. EPCE, founded in 2010, in order to break the prevailing oligopoly in the cement and construction industry and to lower price levels, was assigned the task of developing new construction methods. A system, which would make it possible to construct high quality buildings quickly, was sought. The choice was made for construc-



In August this year a five-storey car park was constructed for the Catholic University of Guayaquil. An addition of two more levels is planned.



EPCE transported hollow core slabs, each 8 m long and for a total surface area of 10,000 m², from Riobamba to Ecuador's largest city.



The precast concrete elements and the connections between them contributed to the fact that the multi-storey car park withstood the severe earthquake in April 2016 without sustaining damage.

tion in precast concrete elements. However, since EPCE had no experience whatsoever in producing precast elements, a partner, who would be able to give advice and counsel, was sought. EPCE found this partner in Echo Precast Engineering and Tecnom.

Comprehensive transfer of know-how

Under the leadership of Echo Precast Engineering EPCE received intensive support on the topics of constructing with precast elements, installation and plant organisation. This service, known as Preteco, accompanied all the phases of the project, from planning to the first weeks of production. In December 2014 the facilities were commissioned in an already existing hall. Since then EPCE has been manufacturing hollow core slabs and solid walls there.

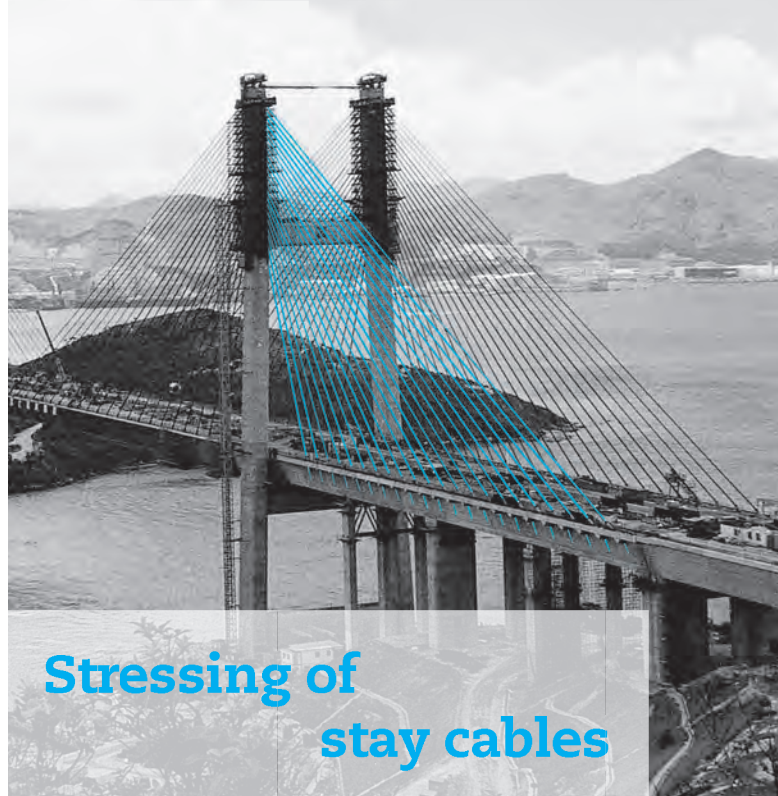
Manufacture of hollow core slabs

Two production beds, each 1.2 m wide and 114 m long, have been installed for the manufacture of hollow core slabs. Both beds were



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A matter of confidence.



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The hollow core slabs are produced on two beds, each 114 m long, with the aid of a slipformer from Echo Precast Engineering.

made to order and their special construction ensures the excellent quality of the slabs produced on them. Thus, the use of concrete under the steel plate contributes to good thermal conductivity, while at the same time providing for the transmission of vibrations and thereby improving the compaction of the final products.

The hollow core slabs are produced using the T30 S Liner, a slipformer from Echo Precast Engineering. The machine has been supplied with three different tube sets and a mould. EPCE can use this to manufacture hollow core slabs with heights of from 10 to 20 cm. The modular design of the slipformer makes it possible to change the tube and mould set easily and quickly.

For elements, which are required to be narrower than the widths provided by the mould set, Echo Precast Engineering supplied a fresh concrete sawing machine to Riobamba. With this machine uncomplicated longitudinal cuts can be made in fresh concrete. The cured hollow cores slabs are finally reduced to the required length using a right-angle sawing machine.

After curing, the concrete elements are lifted by means of specialised lifting equipment or loaded on HGVs and finally transported to the construction site. Prior to the next production cycle a multi-function trolley is used to clean and oil the bed and pull the strand and wires.

Manufacture of solid walls

Solid walls are produced on a total of seven tilting tables. The Type TTE tilting

table, manufactured in-house by Tecnom, can be divided into sections and thus can be shipped from Europe to Ecuador cost-effectively and without difficulty in standard containers. They are assembled on site. The accurate grinding of the shuttering surface, the compacting equipment and the integral heating system guarantees optimum quality in the precast concrete elements produced. By using lateral shutters EPCE can produce elements in various shapes, sizes and strengths, including the slots for doors and windows. Once curing is completed, the table is tilted. This makes extracting the finished element safe and simple.

Confidence in the future of construction in precast concrete

With the commissioning of its own precast concrete plant EPCE now works in the entire value chain in the cement and concrete industry - from the extraction and production of the raw materials to the manufacture of precast elements. EPCE expresses its confidence in the future of construction in precast concrete elements in Ecuador: the country is ready for it, the people are increasingly demanding quality.

The earthquake in April marked a turning point in attitudes towards the new construction techniques. The natural disaster fundamentally shook the population's faith in conventional building methods. It showed what the consequences of not complying with standards can be and how important it is that the concrete has a good composition. Unquestionably, construction in precast concrete elements offers the solution to this problem. ■

FURTHER INFORMATION



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